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# Becoming citizen subject in the body politic: antinomies of archaic, modern and posthuman citizenship temporalities and the political of mathematics education

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## ABSTRACT

Mathematics education in the body politic is commonly argued as important for citizenship, the citizen and the subject but, often, the concepts remain unexamined. Based on Étienne Balibar's political philosophy, the "becoming citizen subject" is traced in antiquity, modernity and posthumanity, through strivings for democracy and its impact for mathematics education is discussed. The article argues that prevailing images of the becoming "competent", "insurgent" and "creative" citizen subject are haunted in antinomies with missing human and nonhuman others acting at the margins of history and determining the political of mathematics education.

## KEYWORDS

becoming citizen subject;  
archaic modern and  
posthuman citizenship;  
mathematics education and  
democracy

## Introduction

As mathematics education is called upon for an ethical response to re/claim democracy in contexts of continuous injustices due to increased ecological decay, poverty, exhaustion or pandemics, the idea of citizenship returns to re/configure mathematical practices. Albeit with different foci, global institutions such as the OECD (2013) or UN (2017) and local communities aim to rethink mathematics education (e.g. policy, curricula, in/formal didactics, teacher education) addressing citizens in contemporary precarity. The recent special issues of *Research in Mathematics Education* (Chronaki & Yolcu, 2021; le Roux et al., 2022) and *Educational Studies in Mathematics* (Chan et al., 2021) are indicative of such urgencies.

Overall, several approaches toward making mathematics education relevant through citizenship can be noted. First, projects appropriate the instrumental citizen as high-achiever and problem-solver, inquirer of socio-scientific issues or wicked-problems with mathematics (Kwon et al., 2021; Maans et al., 2019). Second, the critical citizen is highlighted as fostering awareness of mathematics' "formatting power" in society or cultivating democratic competences (Skovsmose, 1994, 2014) empowered for social justice

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(Gutstein, 2005). Third, the diverse “other” of native communities and indigenous territories (Aikenhead, 2017; d’Ambrosio, 1985) is foregrounded as non-citizen or not-yet-citizen around struggles for recognition and rights for lands, heritages, languages, values, and knowledges including the right for culturally responsive mathematics education. Fourth, the marginalised, oppressed and discriminated against, as second-category citizen, are discussed as the product of persistent systemic inequalities in urban schooling with devastating effects on individual and collective lives due to racism, sexism, and ableism (Chen & Horn, 2022; Tate, 2008). Fifth, the modern citizen subject of mathematics education is captured as a “mastery of reason” fantasy (Walkerdine, 1988) or as an alchemy governing people (Popkewitz, 2004) and sustaining capitalism (Baldino & Cabral, 2018).

Although the above suggest different investments of mathematics education to determine citizen subjectivity, the concepts of citizenship, citizen and subject remain largely unexamined, functioning as empty signifiers that conceal unresolvable antinomies. The notion of antinomy describes the paradoxes, tensions or aporias referring to “a problem that can be neither definitely resolved nor utterly eradicated” (Balibar, 2015, p. 2). Antinomies in mathematics education occur when differential exclusions persist despite efforts for social justice, inclusionary pedagogies, or “maths for all” curricula (Marcone & Skovsmose, 2014; Walkerdine, 1988). Balibar (2010) theorises citizenship as fraught with antinomies, that unfold in historical and socio-material settings, linked to the citizen’s political agency for democratisation. Unexamined antinomies reproduce binary discourses that *either* deliberately strive for citizenship acts with competent subjects in a democratic civil society (the citizen as agent for systemic change: *first to fourth approach*) or critique such strivings as destined to fail (the citizen as always subjected to systemic power: *fifth approach*).

The present article turns to Étienne Balibar, a scholar whose devoted study of becoming citizen subject considers citizenship antinomies as temporal spaces where non/yet/citizen subjects appear in the body politic. Balibar, close to proletariat struggles and social movements in the South of America and Europe, creates a philosophical political anthropology of both citizen and subject. He conceives “citizen” and “subject” as European inventions, created to pursue democracy in ancient and modern epochs and by occasion of the coronavirus pandemic, ponders the posthuman condition of living times (Balibar, 2015, 2017, 2021). By tracing the “becoming citizen subject” in-between subjection/agency, he motivates this article’s key question: *What images of becoming citizen subject are traced through antinomies of citizenship temporalities and how do they permeate mathematics education?* For this, the next section discusses the citizen subject, whilst the subsequent sections encounter citizenship genealogies and antinomies in antiquity, modernity and posthumanity; and the last section speculates the political of mathematics education.

### **Citizen subject in the body politic: in-between subjection and agency**

“Citizen subject” was Balibar’s response when, in the late 1980s, Jean Luc Nancy asked “who comes after the subject?” as invitation to debate a recurrent controversy about the “death of the subject”. Instead of asserting a death to the subject, Nancy (1991) sought to interrogate the placing of “subjectivity on trial” (p. 5) insisting to reinvent

the “who”. Haines and Grattan (2017) note that posthumanity realises the limits of the subject, as a modern synthesis of self and otherness, or a disciplinary technology and argue that: “the subject becomes artificial, contingent, perishable” (p. 5). The limits of the subject as a “humane who”, and the radical quest for how its material substance has been rendered invisible in modern subjectivity, was brought as response to Nancy’s call. Specifically, Derrida (1991) noted the risk of restricting the pursuit of a “who” into an anthropocentric grammar in which the spectres of liberal personhood, possessive individualism, man-animal opposition, or identity positions create the return of a repressed subject. And Deleuze (1991) moved actively away from the “who” to discussing “the non-person or It in which we recognise ourselves and our community better than in the empty exchanges between an I and a You” (p. 95), treating subjects and objects as rhizomatic machines. At this intersection, Balibar (1991) located “citizen” next to the “subject” and Montag (2018) commends:

By tying the subject to a word and a concept whose disappearance appeared unthinkable -the citizen- he raised the problem of the subject in a way that made visible the fundamental and irreducible antagonism that the notion of the subject embodies (p. 39).

This “irreducible antagonism” was core in Althusser’s theory, capturing the interpellated subject in total subjection to systemic capitalist relations. With the notion of Ideological State Apparatuses (ISA), he explained how ideology materialises in state institutions or cultural artefacts by falsifying agency and, thus, making freedom symbolic: “there are no subjects except by and for their subjection” (Althusser, 1971, p. 182). The subject remains antinomic and split in conflictual meanings: one assumes *free subjectivity* as centre for consciousness and the other claims for a *subjected being* obeying higher authority. The interpellated subject is, thus, subjected in “free submission” to the absolute Subject (i.e. big Other, law, morals, rules, identities, norms) mirroring the image of God: “God needs men, the great Subject needs subjects” (Althusser, 1971, p. 180).

In mathematics education, the focus placed on fixed identities, curricula, assessments, tasks, stories, or games becomes instrumental for the subject’s interpellation to state, religious or cultural power. Specifically, Walkerdine (1988) argued that mathematics education serves as ISA, making subjects strive for an illusionary “mastery of reason” through intense compulsory mathematics education. Children subjectify to “real” world problem-solving from the early years up to secondary education, for developing democratic citizenship ideals. She observes how this fantasy harms oppressed children who turn to “mathematical rationality” as defense against their own precarity but with painful transitions across “real” and “fictitious” life. Walkerdine (1988) in “Counting Girls Out” has specifically argued how children and caretakers (mothers and teachers) from working and middle classes in the UK are confined into gendered bourgeois discourses that determine learning paths. Lundin (2012) examines, later, the function of word-problems in Swedish mathematics curricula as institutionalised play/games, where children are interpellated to a blind faith in mathematical truths; Straehler-Pohl (2017) discusses the de/mathematisation dialectic in popular media of late capitalism. Recently, Yolcu (2021) considers curricula reforms in Turkey focusing on problem-solving and collaboration through specific pedagogic devices (e.g. self-assessment checklists). She analyses how international designations become nationally appropriated by monitoring mathematics teachers’ and students’ ways of working. And Baldino and

Cabral (2018) emphasise enjoyment (*jouissance*) noting the subject's willing subjection to success and qualifications in mathematics that feed the dreams of a citizen who excels in the neoliberal economy of capitalism. Such work aligns with "narratives of success" as a life-long project inscribed by OECD documents and discussed by Andrade-Molina (2021). Interpellation to textbooks, curricula, assessments, or global policy documents prevails in these studies, figuring the "repressed subject" to a vicious "circle of subjection" (i.e. where the subject remains freely subjected to authority) that Derrida and Deleuze critiqued as politics' death and Balibar (1991, 2017) twisted to "citizen subject". In this article, I am arguing that the "becoming citizen subject" offers a space to politicise mathematics education.

Balibar, student of Althusser and contributor to *Lire le Capital* (Althusser, Balibar, & Bidet, 2015), acknowledges ISAs for making visible capitalist re/production modes but questions the continuous trap into the "circle of subjection". Problematising the subject as eternally subjected to sovereignty (i.e. God, feudal or modern power) he attends to how the interpellated subject's agency emerges within ant/agonistic struggles (Balibar, 1991, 2017). And, by considering the coronavirus impact on rethinking life as both political (*bios*) and biological (*zoé*), Balibar (2021) argues that, as the virus crosses species, pre-established identities hybridise, and new relational ontologies appear. This realisation allows the agentic subjectivity of multiple nonhuman others as objects, plants, animals, codes, or viruses to enter the spectre of life, as vectors of contagion, infection, and immunity (Balibar, 2021; Esposito, 2013; Vibeiros de Castro, 2014). In this realm, Montag (2018) maintains that by placing the word citizen next to the subject, Balibar crafts a political space in-between the subjection/agency antinomic binary.

Balibar steps back to read subject and citizen genealogies alongside citizenship in literary, historical and philosophical traditions and offers the "becoming citizen subject" noting that after the subject comes the citizen but the citizen remains a subject: *the becoming-citizen of the subject and the becoming-subject of the citizen* (i.e. Balibar, 2017, p. 4, 30). Balibar considers "subjection" as traced to Kant's reading of Descartes' *subjectum* (subject in Greek is *υποκειμενον*, meaning the subject's bending) on which the reflective and critical subject is construed as subjected to authority. Still, citizenship in modernity reveals the agentic insurgent subject, moving contra subjection through collective strivings for lands, rights, and representation. And, today, the human core of modernity is troubled by nonhuman others (e.g. virus, geology, wildlife, code, data), forcing us to recognise life with diverse non/organic species, beyond intentional human deliberations, and as a matter of living with the risk of death and the joy of regeneration (Colebrook, 2011; Deleuze & Guattari, 1987). The next three sections encounter the becoming citizen subject across epochs and trace its impact for mathematics education.

### **Antiquity and the polis: citizenship constitution and the competent citizen**

Thucydides, in the History of Peloponnesian War (431–404 BC), argues how war, economy and sovereign power created the great polis of Athens, its expansion to colonies seeking new markets and its military borders, in the name of security and peace

(Vardoulakis, 2013). Founding Athens transformed the nomadic life of rural people searching fertile soils, into a settled community of diverse kinship. Driven by war and precarity, people sought asylum, and upon becoming citizens (πολίτες) they constituted demos (δήμος) – the body politic of democracy (δημοκρατία). Whilst demos means “people” and democracy signifies a regime based on people’s self-governance, the words polis (πόλις) and politics (πολιτική) share the same root with the words citizens (πολίτες), citizenship (πολιτειότητα) and culture (πολιτισμός). Citizens and citizenship are determined by the city’s spatial borders and the political, economic, and cultural bonds amongst inhabitants of common spaces. Aristotle (2009) proposes “citizenship constitution” or politeia (πολιτεία) to discuss democratic governance through educating people in specific virtues, values, and ethics. For Balibar (2015), this is the first moment of citizenship’s genealogy.

### ***The democratic polis and the competent citizen of antiquity***

Aristotle (384–322 BC), a student of Plato and tutor of Alexander the Great, theorised democracy as the ideal governing of polis. Balibar (2015) notes how Aristotle determines politeia around three principles. First, citizens create “laws” around duties and rights and agree upon power positions that allow them to govern their community. Second, power amongst citizens in giving orders, receiving, or obeying them must alternate. And third, positions of power are proportionally distributed in *isonomia* (i.e. equal distribution of power) relative to citizens’ capabilities for performing the laws of democracy in the polis. The citizen is subjected to the political holder of duties, rights, and competences – a prevailing citizen image in liberal democratic regimes of our times.

For the becoming citizen, Aristotle proposed education as “care for the self” in free public schools for training youth into active, critical, and wise subjects able to lead a political life, called bios (βίος πολιτικός). In the *Nicomachean Ethics and Politics*, he emphasises *phronesis* (i.e. practical wisdom) to endorse will (βουλεύειν) and judgment (κρίνειν) for political participation. Phronesis is key for constituting laws and norms that safeguard peace, security, and safety. Education, for Aristotle, must be the “same for all” so that diverse children grow together in good habits of moral and intellectual virtues, experienced through the ethos of “friendship”. Wisdom training means pursuing collectively “truth” with “reason” and “rationality” (Curren, 2010, p. 545) and citizens are educated to reason publicly in *agoras* (agora: open assemblies) for being able, not only to invent, but also to protect the democratic laws. It is noted how mathematics education becomes pivotal for cultivating political processes of reasoning, argumentation, and proof, as truth-telling for democracy – a view that continues until today to determine mathematics education practices.

However, the polis of Athens was conceived upon massive exclusions. Civil equality was not granted to women, children, slaves, disabled or the technically oriented, who remained non-citizens but still had to obey the laws. Whilst Aristotle’s focus was the political subject of competent citizens (i.e. timocracy), securing power and peace both at home and in colonies, Zeno, the Stoic, detoured. In opposition to a competent body politic, he argued for communal rule with internally constituted laws in which citizens live a common *nomos* (i.e. law) beyond geopolitical borders or ability boundaries. It is

on this image, as Sellars (2007) explains, that Deleuze based his nomadic theory and Kropotkin ascribed Zeno as a proponent of anarchism.

### ***The competent subject in mathematics education***

The idea of a competent citizen subject, as encapsulated above, occupies mathematics education research and policy addressing democratic reforms or renewals. I identify four such perspectives. First, a competent subject as confident reasoner and problem solver in mathematics education is brought in national state curricula and is, often, aligned with international assessment practices (e.g. PISA, and TIMSS). The subject is trained to develop skills through individual or collaborative work in procedural tasks or realistic word-problems, to perform in examinations or competitions and to value mathematical success (Foster, 2016). In this line, mathematics offers instrumentally sustainable solutions in didactic inquiries of socio-scientific issues (Maans et al., 2019). Second, a critically competent citizen is conceived as important to counter the assumed neutrality of mathematics in a highly technological society, accountable for world catastrophes. Specifically, Skovsmose (1994), inspired by Freire, but also Habermas who builds on Aristotle and Kant, argues for “democratic competences” that critique the “formatting power” of mathematics in society; and, recently, Herheim et al. (2021) discuss live democracy in classrooms. Third, a citizen competent to act publicly is proposed by Frankenstein (1990) and Gutstein (2005), focusing not merely on critiquing the perils of applied mathematics in society but transforming mathematical tools into “weapons” for people struggling to subvert injustices through community activism and solidarity acts. Acknowledging the utopian character of such endeavours in state schooling, Povey and Adams (2021) debate the need for critical global citizenship in mathematics classrooms that disorders the prevailing order of depoliticised mathematical activity. And fourth, the invisible or silenced competences of citizen subjects of a different culture, identity, or language, outside the so-called civilised or educated West are discussed in the scholarships of: ethnomathematics (d’Ambrosio, 1985; Powell & Frankenstein, 1997); multimathemacy (Pinxten, 2016); multi/trans/languageing (Planas & Chronaki, 2021); Indigenous languages and cultures (Aikenhead, 2017; Trinick, 2016), confronting neo-colonial acts of globalising Eurocentric mathematics curricula. In this line, le Roux and Swanson (2021) discuss the co-constitution of place, global critical citizenship and decoloniality, asking for reflexive mathematical activity.

These diverse views of competent citizens within mathematics education are not equally accommodated in theory, policy, and practice. The first perspective prevails in mathematics classroom research and praxis reflecting the Western Eurocentric impetus of a mathematical subject enacting critical reasoning and rationality. The other three emerge more at the margins of urban, rural, or Indigenous communities and argue in competition with the first. As these images translate into mathematics education apparatus, the hegemony of an instrumental problem-solver, as desired citizen, reproduces the assumed in/competence of subaltern or cyborg others to reach certain quality and equity standards that determine the fiction of a self/society limitless development (Chronaki, 2011a). And, although the critically competent citizen (i.e. subjects capable of questioning mathematics education for social injustices)

gains ground in inclusionary pedagogies, multiple exclusions endure. It is, thus, pertinent to ask how such antinomies in mathematics education are evoked in Aristotle's *politeia*.

### ***Antinomies of the competent citizen subject in politeia***

Reading *politeia*, Balibar (2015) notes that antinomy is rooted in Aristotle's call for competences around consensus as "entry conditions" for educated citizens in a political community governed by the principles of *isonomia* and *unity*. Since, the discourse of competences is core for the mathematics education community strivings for democracy, one may wonder how does the struggle for *isonomia* and *unity* engulf antinomies? First, *isonomia* emphasises rotating power (law, rules, positions) as equally (or proportionally) shared amongst people in civic duties. To become a competent citizen, one must cultivate the ethics of will (*βουλευίη*: deliberative decision making) and judgment (*κρίνειν*: critiquing this process) as central for democracy. Balibar (2015) alerts us that, by enforcing them as "entry conditions", internal borders are crafted in the body politic that create, *de facto*, antinomies at the level of expertise. Specifically, enforced competences for the active citizen subject in the public sphere, even when taken as basic mathematical literacies, will exclude subjects who do not (yet) possess them, by constructing those subjects as non-competent. This act risks, further, the effect of un/intended subjection into discourses of ableism, sexism or racialism, rendering subjects into a permanent need for development (i.e. becoming educated, civilised, cultured) as a permanent condition for recognition. Such effects can be traced in struggles of marginalised people in modernity as "becoming citizen subjects", claiming their right to civil education but also to local knowledges, languages, and capabilities. Second, *unity* (i.e. internal equilibrium) depicts a political community focused on common good and interest in consensus. Citizens learn to endeavour for consensus as they encounter demands for *isonomy* by conforming to authority (i.e. "by obeying we learn to command" or "by exercising authority we learn to obey"). Pursuing consensus comes primarily through cultivating epistemic norms and identity positions, discussed by Foucault (2008) as biopolitics (i.e. implicit persuasive strategies for governing populations). As such, when mathematics education tends to prioritise classroom culture by emphasising consensus in fixed epistemic norms and identities (Cobb et al., 2011) the space for dissensus is limited or, even, erased, and subject agency is reduced (Ranciere, 2006).

Summarising, the competent citizen subject was conceived as the condition for democracy in the bordered polis of antiquity and remains, until today, core in diverse perspectives of mathematics education. For becoming competent as active, reflective, or critical citizen in the body politic, the subject must learn to participate in *isonomia* and *unity*, pursuing consensus. Whilst consensus competences (e.g. argumentation, reasoning, truth) are basic in mathematics education, enacting them as "entry condition" can create unresolvable antinomies. Seeking consensus at any cost, for the sake of *unity*, serves to oppress rather than empower the political subject. Ranciere (2006) has opposed such conditions as deadening democracy and argues that they, ultimately, determine unequal share in the organised community. Becoming "share-less" in mathematics education could be the effect of erasing disagreement,

repressing conflict, or silencing difference between majoritarian and minoritarian knowledges. Balibar (2015) warns that dissensus never disappears but returns anew as the driving force shared by people in agonistic strivings, creating the insurgent citizen subject, as will be discussed below.

## **Modernity and the nation-state: social citizenship and the insurgent citizen**

I now move to Balibar's second epoch: Modernity. For discussing equaliberty, Balibar goes back to "aequa libertas" a concept coined by Cicero (106–43 BC) as core for "res publica" where liberty (i.e. freedom by law) exists on the condition that it is "equally established for all". The concept has gained political and legal status, making the spirit for Magna Carta, American and French Revolutions, or, even, the Paris Commune of 1871 and people's direct democracy (Ross, 2016). The citizenship idea travels from antiquity to medieval, Byzantine and Ottoman times, governing populations, bordering inclusion and exclusion practices, creating the cultural, spiritual, and economic glory of cities such as Rome or Constantinople and, even, curing epidemics (Welton, 2020). But citizenship in central Europe is tied with nation-state establishment by the Westphalia Treaty (1648) where the right to practice one's own religion under the sovereignty of signatory nations was recognised as a gesture to end wars (Pfeifer, 2020) but, in fact, launched spatio-political boundaries in domestic and international affairs perpetuating enclosures and oppression (Fraser, 2005).

### ***The nation-state and the insurgent citizen of modernity***

August 4th, 1789, the night of French Revolution, signifies, for Balibar, the insurrectional moment of citizenship genealogy. Revolt against Louis XVI's reign started when the Estate of commoners and bourgeois alliance convened, to organise in democracy, and combat tyranny and inequalities prolonged by the Estates of clergy and nobility that covered only 2% of the population. People's insurrections paved a path in which the "Declaration of the Rights of Man and of the Citizen" was constituted. Enlightenment ideas (i.e. property, social contract, reflective individuals, separation of powers) and preceding constitutions (i.e. Magna Carta:UK:1215, Declaration of Independence:US:1776) helped to define "rights" in 24 articles stressing law superior to monarch. Its core became the universal principle of "men are born and remain equal in rights". Its patriarchal orientation was opposed by feminist Olympe de Gouges who in 1791 wrote the militant Declaration of the Rights of Woman and of the Female Citizen, exposing gendered injustices but, upon its publication, she was convicted of treason and executed (Mousset, 2007).

It is important to note how the discourse of rights served the emerging "democratic" states in Europe to govern their own nations but also to expand their rule to colonial territories by imposing the "right" to enclose lands, enslave people and accumulate wealth. In parallel, science gained power over religion by advancing the logics of "truth", "representation", "objectivity" and "quantification" and assembling the massive social experiments of industrialisation, capitalism, and eugenics. These logics mark again biopolitical strategies governing life, not by sovereign law but through the authority of numbers,

including statistics and political arithmetic (Foucault, 1991, 2008). These are the times of nation-states dreaming of unlimited growth via technoscientific innovations and of noble civilians assuming the “right” to govern “others” in slavery and exploitation. The legal articulation of citizenship into laws that protect citizen property and freedom to act turned to conceiving even human subjects as property (i.e. female, children, slaves, the disabled). This has produced genocides, femicides and epistemicides throughout Europe and its colonies. Indicative is the deadening of Indigenous local knowledges, languages, and cultures (De Souza Santos, 2014), the massive enclosures of communal land and earth mining (Linebauch, 2014), the violent attacks on queer and female subjects such as the witch hunting in medieval Europe (Federici, 2004) or human design via the normative metrics of eugenics (Maranto, 1996). Next to such harmful acts, people were forming transversal solidarity alliances in the multitude of land-workers, proletarians, women, youth, Indigenous or queer communities. It was, always, through people’s insurrections in social movements that marginalised subjects re/claimed public presence and legal articulations of their rights to recognition through laws, in citizenship constitution.

### ***The insurgent subject in mathematics education***

Much writing examines the role of mathematics and mathematics education in enunciating modern subjectivity in Enlightenment virtues (Popkewitz, 2004; Powell & Frankenstein, 1997; Walkerdine, 1988). Whilst, in medieval times, mathematics was placed in despotic circles and arithmetic offered for trade purposes, the times between the seventeenth and eighteenth centuries witness mathematics interweaving with knowledges of craftspeople, clerks, merchants, or governors gaining status as “political arithmetic” (Porter, 1995). During the nineteenth century, most developed Western nations, such as the US, converted mathematics education into state apparatus “for fostering healthy citizens by recruiting ‘all classes’ of (free white) children into liberal self-governance” (Ziols & Kirchgasser, 2021, p. 129), and the twentieth century made mathematics compulsory for all citizens (Popkewitz, 2004; Tröhler et al., 2011). In the WWII aftermath, Marschall and Marshall (1950) endorse “social citizenship” for the US liberal democracy, to remedy poverty and migration. In parallel, the cold war framed competitive politics around science diplomacy, making science and mathematics education priorities for leading nations (i.e. WestNorth) or participating ones (i.e. SouthEast) in world affairs. Discourses of self/society limitless development intertwine with mathematics curricula global pleas for quality and equity, creating, despite good intentions, local injustices for cyborg and subaltern subjects (Atweh et al., 2011; Chronaki, 2011a, 2011b). Social citizenship antinomies open, once again, people’s insurrections in the 1960s, claiming their “right to rights” (Arendt, 1972) in which the “right” to “education” become part of unceasing battles. How could we, then, grasp the right to mathematics education in this milieu?

Claims for the right to mathematics education drive concerns for systemic inequalities and inequities in mathematics teaching and learning that tend to perpetuate low achievement and failure for children already suffering multiple oppressions. Scholars who espouse social justice perspectives at the intersections of race, gender, ability, or Indigeneity (Bullock & Meiners, 2019; Gholson & Martin, 2019; Trinick, 2016) strive to

map the continuing injustices of educational policy. In this realm, the “maths for all” rhetoric foregrounds future citizens through curricula reforms but, it responds neither to concerns about underachievement nor to societal struggles for justice. In addition, it does not address issues related to why students refuse mathematics (Chronaki & Kollasche, 2019). Recent scholarship (Chronaki & Yolcu, 2021) discusses how this rhetoric turns easily into a neoliberal fix for inter/national politics, advancing a mathematics education for sustainable futures where diverse populations are promised to thrive. Devastating effects on migrant children’s lives are addressed by Valoyes-Chávez et al. (2021), who argue that claims to include young black Haitian immigrants in Chilean mathematics classrooms reassemble racial biases, casting them as second class citizens. Reviewing research for understanding the perseverance of inequalities and marginalisation in mathematics education, despite efforts for inclusionary pedagogies, Chen and Horn (2022) note issues such as pervasive systemic oppression precluding social interaction, intersectional contact or identity heterogeneity and favouring privilege reproduction. Their review acknowledges the fissure between structures (i.e. institutions, curricula, standards, assessments, identities) and agents (i.e. actors, learners with knowledge, skills, values and ethics).

### ***Antinomies of the insurgent citizen subject in social citizenship***

Divides of structure/agent align with Balibar’s attention to the subjection/agency antinomic binary. Theorising social citizenship as the insurrectional moment of collective rights’ political articulation, Balibar explains how equality (i.e. collective demands at a structural level) and liberty (i.e. freedom to act or individual demands as agency) retain antinomies. Freedom and equality relate reciprocally since any political situation that defeats freedom automatically reduces equality and vice versa (Balibar, 1991, p. 49). Reading the “Declaration of the Rights of Man and the Citizen”, Balibar (2015) argues that since the couplets of “equality-liberty” and “man-citizen” are grounded in the secondary principles of fraternity, property and power, the Declaration creates antinomies across opposed individual and collective demands in the body politic. These are determined by the nation-state’s political condition of democracy and remain irreversible without people’s resistance or revolt. He, thus, proposes “equaliberty” to stress the radical, yet utopian, integration of equality and liberty that fulfils individual demands (liberty) within the collective (equality) and vice-versa, amalgamated in moments of political transformation and emancipation. Balibar maintains that although there are no guarantees, the striving for “equaliberty” makes visible the internal borders in societal planes, where structural injustices reappear as antinomies of subjection/agency, inclusion/exclusion, or empowerment/oppression. He argues that these injustices create the political drive for citizens, non-citizens, not-yet-citizens or the “missing others” of citizenship to ally in collective agonistic struggles. Herein, the citizen subject of modernity becomes the event of differential insurrections and constitutions. In mathematics education, the insurgent citizen subject figures as the activist teacher or student, who strives in solidarity with marginalised learners, teachers and their communities against inequalities and toward claiming rights for diverse mathematical languages, cultures, and knowledges in school settings.

Conferring the antinomies of social citizenship in modernity, the limits of the insurgent citizen subject become recognised (Balibar, 2015). First, Balibar discerns that even though “equaliberty” has historically inspired social movements to organise around class, gender, sexuality, race, it reproduces the antinomy of active/passive citizens as mutually exclusive. An active citizen is considered the subject who is competent to participate in public politics (i.e. often “men” of certain origin, gender or age, property owners, tax payers), to act with the zeal of patriots who cultivate bourgeois skills (i.e. languages, behaviour, style, taste). In contrast, the passive citizen is, often, the invisible “missing other” from the body politic who, nevertheless, remains imperceptibly active at the margins. Although the active subject is prioritised in modernity, the active/passive binary has been critiqued by feminist postcolonial scholar Spivak (1988) who, by asking: “can the subaltern speak?”, has argued that specific subjects have important reasons for staying passive. Passivity is not about incompetence for becoming active but deserves a counter-reading. The presence of assumed passive subjects pervades mathematics education praxis, as we work with subjects of hybrid identities, languages, and bodies (Chronaki, 2011a, 2011b, 2019) denoting the limits of the *becoming insurgent subject* in mathematics classrooms.

And second, reflecting on social citizenship as invention for liberal democracy after WWII, Balibar (2015) highlights that despite claims for resolving large-scale inequalities, the political aim was to, implicitly, regulate people’s insurrections (i.e. class, racial and gender movements). By guarding “the rights of organised labour and in systems for protecting individuals against the risk associated with the proletarian condition” (p. 47), the proletarian became a public danger. As such, social citizenship grew into a strategy for neo/liberal democracies to neutralise agonistic struggles and normalise behaviour, through institutional “mechanisms for reproducing political consensus” (p. 58). Mathematics education becomes, again, pivotal under the universalist pretention of “governing equality” in “maths for all” reforms (Diaz, 2013). Resolving social injustice issues through mathematical models figures the interpellated subject of a fictive democratic competence mastery, as discussed in the section “citizen subject in the body politic”. With Balibar, this condition runs the added risk of enclosing the insurgent citizen in the bordered comfort of mathematical activity (i.e. schools, classrooms, screens, texts) that by pursuing the reproduction of political consensus, they pacify the importance of inventing new subjectivities through dissensus and affective solidarity across bodies.

In sum, the insurgent citizen subject, tied with the founding of empires and nation-states upon patriarchal, colonial, and capitalist interests, creates social citizenship in late modernity. In this context, the becoming citizen subject is the event of differential insurrections and constitutions grounded in antinomies of equality and liberty as utopian universal principles. The insurgent citizen inspires mathematics education activist projects enacting solidarity with marginalised, oppressed, or silenced people and their knowledges. And as mathematical activity stages rhetoric processes (i.e. argumentation, reasoning, modelling, proving) it can, also, represent people’s strivings for rights around certain political consensus. However, enforcing active/passive citizen subject dichotomies may serve to reproduce subjection/agency binaries and fail to sense the missing others inhabiting mathematics classrooms as inactive participants but who, in fact, might dissent in silence.

## **Posthumanity and the body: expansive citizenship and the creative citizen**

At the time of writing this article an earthquake with epicentre in central Crete made, in seconds, a nexus of villages, including mine, uninhabitable and people devastated (Wikipedia, 2021). Such affective events prevail alongside irreversible socio-economic crises, refugee waves of people facing wars, violence, environmental catastrophes, or pandemics. Colebrook and Weinstein (2017) argue, in their “postscript on the posthuman”, to think of our “deep geological time” as a chronotope before humans existed in planet Earth (p. i) and to read the Anthropocene as a “geological archive that testifies to our once forceful existence” (p. i). Speculative posthuman life is created in science fiction narratives from Shelley’s *Frankenstein* to Asimov’s *Robotics* and Le Guin’s utopias or fascist regimes banning mathematics (Chronaki, 2018). Hayles (1999), tracing the posthuman in literary and science discourses, claims for the body’s creative virtuality within material-information complexes that, for Kymlicka and Donaldson (2014), compels citizenship to expand by considering nonhuman ethics in the body politic.

### ***The body and the creative subject of posthumanity***

The study of posthumanity allies with both Life Sciences and Humanities focusing on how nature, science and culture interweave to determine needs or desires for producing technological artefacts, smart objects, or bio/info/materials that create new life. For this, posthuman subjectivity prioritises creativity by challenging core conceptions of antiquity (i.e. the Aristotelian human as competent) and of modernity (i.e. the Kantian human as reflective). The creative posthuman subject disturbs language superiority over matter (Barad, 2003), recognises code for opening channels across un/non/conscious cognitions (Hayles, 1999) and favours human-machine-animal cyborgs for supporting processes of communication-control-command (Haraway, 1990). As such, the becoming citizen subject in posthumanity expands from a humane *who* toward its sociomaterial nature/culture, as a creative product and process.

Balibar (2021) encounters posthumanity in the coronavirus pandemic, claiming that this juncture marks the subject as a biopolitical event at the species level. With epidemiology, he notes that species, by being exposed to increased connectivity, become interchangeably contaminated and contaminants. In this, the virus converges with forces of biology, ecology, technology, and economy, relativising cultural bonds or nation-state borders, intensifying differential in/exclusions and subjectifying societies into common anxieties of death, infection, and immunisation. Biopolitical governing works again today, as in ancient and modern times, by regulating the “conduct of conduct” amongst people and pursuing certain behaviour norms or bodily habits (Foucault, 2003, 2008). Agamben (2021) depicted the pandemic as intensified surveillance biopower, signalling a global “state of exception”, where everybody is a contagion vector. Mathematics contributes by modelling infection rates in calculus graphs assembled to enact certain health policies. Scholars discuss this amplified biopower of mathematical expertise in public media and problematise its effects in mathematics education (see Chan et al., 2021). Although Balibar (2021), along with Foucault and Agamben, critiques biopower’s force for governing human societies, he maintains that the pandemic has

prioritised life itself. Considering the virus as “crossing the species barrier” and of organisms as “permanently colonised by a great variety of viruses”, he explains that although at the core of the pandemic is our political life (bios), it is the realisation that biological life (zoé) remains perishable that, today, determines the political.

At this intricate point, Balibar resorts to the work of Viveiros de Castro and Esposito who reconsider nature/culture, person/thing, and subject/object divides. On the one hand, the geo-philosophy of Amerindian shamanic thinking espoused by Viveiros de Castro (2014) pursues a perspectival shift from Western politics of multiculturalism, toward cosmic multinaturalism, by hybridising subject/object binaries. He stresses that since “a subject is an insufficiently analysed object in the modern naturalist world” we must ponder how the “object is an insufficiently interpreted subject” (Viveiros de Castro, 2014, p. 60). In this vein, Kohn (2013) maintains in “How Forests Think” that logics of causality and representation must be linguistically decolonised to sense the non-human signs of wildlife such as rocks, plants, animals, or spirits.

On the other hand, the bio-philosophy of Esposito (2013) crafts community immunology as an organic body in/excluding infected cells. He theorises communal life as a subject/object amalgam that, reproduces identity infection (i.e. nationalistic, ethnic, fascist, racist, sexist or ableist positions) and, thus, seeks immunisation. Diverse forms of immunity become the defence of creative subject/objects hybrids against identarian bonds considered as dangerous contagion for the living body. In this condition, the body of a person ceases to be property of the individual who dwells it and turns into an impersonal common shared as gift to biological life. Biomedicine provides examples where the gift of transplants as impersonal body organs, or the ingestion of hormones as molecular body control, transforms subjectivity based on gender, race or ability. The “battle for life” in body-design is determined by creating and marketing products and processes of an experimental corporal and discursive nature. Their differential in/adaptations for generating certain body and life images based on the voluntary “principle of auto guinea pig” (Preciado, 2013) remains antinomic since the presumed creative post-human subject/object machinic assemblages may risk reinscribing anti-humanist ideals of profitable innovations that ignore the reproduction of violence, extinction, or death.

Expanding citizenship beyond humans has implications for communities seeking the politics of ethical responsibility across humans, animals, lands, codes, information, and biotechnologies. Legal studies have started discussing posthuman citizenship by interrogating anthropocentric rights based on Euro-American, male, white or heteronormative ableism and expanding legal subjectivity to non-human others (Hanafin, 2018). Specifically, “the right to be forgotten” is recognised for digital privacy concerning personal data information and online security (Käll, 2017), national citizenship constitutions accommodate environmental rights (e.g. Equator and Bolivia include nature in legal forms of citizenship) or cyborg recognition (e.g. Saudi Arabia assigned citizenship to female robot Sophia).

### ***The creative posthuman subject in mathematics education***

The creative posthuman subject has gained interest in mathematics education mainly with the work of de Freitas and Sinclair (2014) who, based on the materialist philosophies of Chatelet, Deleuze and Barad, revisit mathematics and the body by proposing “inclusive

materialism” to emphasise mathematical invention. Rousell et al. (2022) discuss creative posthuman subjectivity in higher education problematising learning as entirely humanistic. In this line, researchers consider mathematical activity in affective bodying with concepts, movement, and materials (Chronaki, 2018), diverse modes of existence (Mikulan & Sinclair, 2019), care relations amongst vulnerable multispecies and communities (Gutiérrez, 2022; Khan et al., 2022) or socioecology for a liveable world (Boylan & Coles, 2017; Chronaki & Lazaridou, 2022).

Though posthumanism theorising is peripheral for mathematics education, certain research compels posthuman thinking. Mathematical activity has been pivotal for discussing environment (Coles et al., 2013), place and space pedagogy (Nicol et al., 2020), local knowledges and ethnomathematics (d’Ambrosio, 1985; Pinxten, 2016), post normal science and fake news (Hauge, 2022) or embodiment (Gerofsky, 2015). Currently, the COVID-19 pandemic created the condition to interrogate mathematics as a vital nonhuman agent in public discourse. Specifically, researchers critique data visualisations design for narrating crisis (Rubel et al., 2021), problem-solving activity for turning biological life into an object of rational decision (Ziols & Kirchgasser, 2021), and raise the increased global pressures for digital mathematics education practices (Borba, 2021). Darragh (2021), critiques the case of marketing online mathematics curricula by private corporations, and, particularly, the tendency to demonise free public state education for failing to create the ideal neoliberal learner as the confident digital citizen. The above studies seem to urge mathematics education to recognise the ethics for creating the antinomies of becoming creative citizen subject in posthumanity. But, in what ways?

### ***Antinomies of the creative citizen subject of posthumanity***

Posthumanity is considered the convergence of the sixth extinction (i.e. biodiversity extinction and environmental disasters in our geological era, Kolbert, 2014), the fourth industrial revolution (i.e. augmented digitalised life based on biotechnology and biodata, Schwab, 2015) and advanced capitalist economy (i.e. accelerated modes of commodified life and consumption habits producing labour exhaustion and democracy fatigue, Braidotti, 2019). Pleas for creative posthuman subjectivities are, often, substantiated in “cruel optimism” (Berlant, 2011), “active vitalism” (Colebrook, 2011) or hopes for an enhanced life, sustained by informed decision-making. In affinity with technoscientific practices, objects are being ascribed with agency as part of networks (Latour, 2005: actor network theory [ANT]) or with autonomy (Harman, 2018: object-oriented ontology [OOO]). Braidotti (2019) critiques the flattening of subject/object relations by either waving class, race, gender, sexuality, ability, or by prioritising computational intelligence (pp. 55–61) and argues for critical posthumanities countering inhumanist capitalist inceptions. In this venture, Balibar confers on posthumanity a necessary perspectival shift that, by decentring the human subject, must encounter its reconfiguration. The subject must be rethought with living species across biology, ecology, and economy through the archaic practices of domestication and artificialisation – both core in the milieu of mathematising – and by reconsidering the question of life itself.

First, human species exist amongst other living species into an ecosystem where they become, unavoidably, colonisers of self and others through practices of *domestication*

(i.e. making kin with plants and animals, extracting resources from nature, data mining, modelling, reasoning) and *artificialisation* (i.e. creating tools, artefacts, prosthetic technologies, expanding intellectual capacities, developing external bodies). Domestication creates a continuous displacement of internal and external borders amongst species resulting not always in sympoiesis (Haraway, 1990) but in exploitation. And artificialisation becomes a transindividual vector extending the organic body of a community or person not always toward impersonal commons (Esposito, 2013) but for capital re/production. Practices of both domestication and artificialisation hint at antinomic tensions where un/sustained hierarchies amongst subjects and objects, persons and things can disturb the living body by making in/visible diverse in/exclusions of dangerous species. Historically, domestication and artificialisation become visible at the threshold of agriculture and industrialisation epochs whilst their presence is accelerated in current biotechnology projects favouring profitable futuristic creations. Asking what kind of species the human subject becomes, Balibar (2021) agrees with Chakrabarty (2021), that geological, social, and technological challenges create posthumanity, as the antinomic machinic assemblage of hybrid im/material bodies that cannot be wholly known, communicated, or controlled.

*Second*, Balibar argues that posthumanism troubles the question of “life” itself, a note also made by others. Parisi (2004) claims how life today is experienced as “bio-piracy” of information about life, since personal data contribute un/intentionally to “big data” flows, fostering subtle biopower reinscribing subjectivity norms. These are processes that the subject alone cannot observe, control, or resist and, thus, neither the competent nor the insurgent citizen subjects can determine posthuman citizenship. The threat of life becoming “bare life” has been discussed as a matter of escalating biopower to necropower where practices of killing and allowing to kill are justified for peace and security (Agamben, 1998; Mbembe, 2003). Balibar (2021) notes that death is depicted during the pandemic not through intentional sovereign power or biopower but with unintended forces of species contagion. Humans enter a passive and unwanted dis/connection with other species in fear of infection and in need for immunisation. Deleuze and Guattari argue for “passive vitalism where ‘life’ *does not act* by a process of intention, decision, and self-preservation of actualised forms, but it instead becomes eventuated through *chance encounters*” (cited in Mikulan & Rudder, 2019, p. 616). Drawing on “passive vitality” as the probability space of socio-material virtuality, Balibar claims how our temporality prioritises a “passive syntheses” of life crossing borders of non/organic bodies.

In sum, the creative citizen subject of posthumanity evolves as corporeal, im/material and discursive machinic assemblages where human and nonhuman divides dissolve into rearticulations where mathematics (e.g. code, algorithm, probability) is a key, yet imperceptible, contributor. The historical practices of domesticating and artificialising living species within nature, culture, and technology make often in/visible the antinomic spaces where demands for profitable creative innovations require expansion of both legal citizenship and contemporary mathematics education practices towards their ethical responsibility for recurrent injustices. Specifically, the posthuman condition may unlock the creative subject of mathematical activity fuelled not with cruel optimism but of “interminable humanism” emphasising anti-narcissism (Vibeiros de Castro, 2014, p. 44) that unfolds becoming citizenship as the event of both critical creation and creative critique.

## Concluding: the political of mathematics education

Mathematics education's concern for the political can be traced back to Mellin-Olsen (1987) who inquired the politics of alienating children from mathematical activity as cutting the self/society relation and, thus, inhibiting change, Walkerdine (1988) who interrogated mathematics curricula for the subject's subjection to a fictional mastery of reason, or Skovsmose (1994) who argued for critical mathematics education through competences of empowerment. During the last decades, researchers confront the political in mathematics education in either weak (addressing educational reform policies for citizen equity) or strong (theorising mathematics power through citizenship inscriptions of the subject) perspectives (Valero, 2018) denoting how mathematics educators need political knowledge (Gutiérrez, 2013). But, how is the political related to becoming citizen subject?

I claim in this article that although the concepts of citizen and subject are core for discussing the political in mathematics education, they remain, largely, unexamined. As such, they tend to reproduce polarised deliberations for a mathematical subject as being either agent for systemic change or subjected to systemic power (see introduction and section on "citizen subject in the body politic"). By encountering the "becoming citizen subject" in archaic, modern and posthuman times and its permeation in mathematics education, I can, further, claim that the political of mathematics education cannot be enclosed in citizenship images constituted around rights, duties, or ethics serving the biopolitics of the ancient polis, the modern nation-state or the machinic posthuman body facing wars, injustices, and viruses. Citizenship converts, easily, into a legal tool that, alongside mathematical biopower (e.g. numbers, political arithmetic, scientific persuasion, administrative procedures, reasoning, algorithms, modelling, data mining, programming, topology) governs people, imposes enclosures, and justifies injustices. As such, strivings for social justice around citizenship ideas (e.g. the right to rights) can neutralise the radical political potential of people's insurrections into lawful modalities of civil power.

However, the political can also occupy a radical space of grounded thought and grassroot activity specifying liberation from oppressive logics of power. For this, Balibar reads citizenship as inherently antinomic and processual and as requiring active/passive participation in political activity that interrogates the institutional legitimisation of injustice always in alliance with people and their social movements. Historically, new political subjectivities do not emerge in vacuum, but in chronotopes where missing others as in/excluded or share-less non/humans disturb the comfort zones of the prevailing competent, insurgent, or creative citizens and strive to re/claim the body politic. Moreover, the political takes flesh in antinomic citizenship temporalities when the becoming citizen subject enters specific ant/agonistic strivings in hope of creating, protecting or, even, democratising democracy. Balibar (2021) has argued for a relational political subject that hybridises subject/object boundaries characterised by transindividuality (i.e. the mutual realisation of its individual and collective nature without reducing one to another) and conditioned by pre-individuality (i.e. the passive synthesis across species) along with supra-individuality (i.e. capitalist modes of reproduction).

Mathematics education, by and large, tries to re/imagine theory, re/design curricula and re/enact classroom practices or teacher education programmes, by resorting to

ideal citizen and subject configurations but, as discussed earlier, without accounting for their conceptual genealogies. As such, the attempt to politicise mathematics education research and praxis around a wide consensus for the idea of citizenship, in abstract terms, remains entrapped in subjection/agency binaries that paralyse or, even, deaden its political subject. With Balibar's "becoming citizen subject", this article hints at two conclusionary points for rethinking the political of mathematics education: first, attending to the limits of consensus around citizen subject images in mathematical practices and *second*, dialoguing with mathematical creations through critical posthuman perspectives.

First, I have argued throughout the article that although the images of competent, insurgent, and creative citizen subjects prevail in specific epochs, all three permeate the contemporaneity of mathematics education and become hegemonic in current efforts to discuss the political. Their cartographies across antiquity, modernity and post-humanity engulf antinomies of in/exclusions by creating internal and external borders and by imposing "entry conditions" that require consensus in the name of security. Mathematics education becomes instrumental for making such internal borders (e.g. curricula, exams, tasks as normative rituals) and for performing certain citizenship images in activity that stages the biopower of mathematics for governing populations and creating new life across non/organic bodies. I suggest that a depoliticised citizen subject lurks through reinforcing consensus practices where mathematics is envisioned as the sole biopower to reason (e.g. the language of facts, truth and logic) at the expense of dissensus. Further, this depoliticised effect may reoccur when repressed dissent enforces images of an unresting, active, insurgent citizen subject, without acknowledging the subject's own situated reasons for remaining passive. For mathematics education to rethink its political, the limits of consensus around ideal images of competent, insurgent, and creative citizens must be attended to by encountering the abyssal lines across non/yet/citizen subjects as both humans and more-than-humans.

Second, at the interval of encountering the becoming citizen subject across temporalities, I argue that citizen subject images in mathematical practices absorb citizenship antinomies by denoting not only the *becoming-citizen* of the subject but also the *becoming-subject* of the citizen. In this enigma, Balibar (2017) stresses that after the subject comes the citizen, but the citizen remains a subject. As seen here, the citizen subject of mathematics education, by and large, rests torn between the subject's unresting revolt and subjection to nation-states, institutions, ideologies, religions, cultures, technologies, or natures. But the citizen subject cannot be reduced to fixed identities (e.g. class, gender, race, ability, language). The subject evolves through ant/agonistic strivings for democracy and un/intended creations and, despite diversities, converges around common assemblages of desire, where ideas and affects invent life anew. Building on these, I suggest that mathematics education research and praxis must affirm its more-than-human political ontology by dialoguing with critical posthuman thinking. Specifically, it must open toward working with the antinomies of becoming citizen subjects as critical vectors in mathematical practices that endeavour not to depoliticise its relation to democracy but, instead, to democratise its relational potential for a democracy-to-come. For this, the capacity embodied in mathematical practices for re/making a political sympoiesis of situated knowledges (Haraway, 1990) in research and education must be

recognised as the affirmative ethics of a dialogical, yet aporetic, relation between “humanist” and “posthumanist” perspectives.

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